

A New Species, Genus, and Family of Marine Flatworms (Turbellaria: Tricladida, Maricola) Commensal with Mollusks

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(3 Textfigures)

Introduction

The animal described in this report brings to three the number of marine triclad turbellarians described from the Pacific Coast of North America. In his monograph of triclads, *Wilhelmi* (1909) described all the marine species known up to that time. Since 1909 new species of the *Maricola* have been added by *Hallez* (1911, 1913), *Böhmig* (1914), *Hyman* (1944, 1952, 1954, 1956), *Marcus* (1947, 1948), and *Westblad* (1952). In 1954 *Hyman* described the first marine triclad known from the Pacific Coast of North America, a member of the *Procerodidae*, *Procerodes pacifica*, which was collected near San Diego, California. In 1956, a second, *Nesion arcticum*, representing a new family, the *Nesionidae*, was described from Alaska by *Hyman*.

The animal described below differs from all known marine triclads in an interesting and significant feature. The oovitelline ducts enter the roof of the penis bulb. This unique feature makes it necessary to establish a new family, genus, and species.

Materials & Methods

The first specimens of the present triclad were collected one mile south of Stinson Beach, California, in 1956. About 70 specimens were collected at various times over the next several years and were preserved in Bouin's fixative. Eight additional specimens were received from Clinton A. Westervelt, Jr., of Lewis and Clark College, Portland, Oregon; 22 specimens were received from Howard Wright of the University

of California, Berkeley; and 18 specimens from Dr. Dana Abell of Sacramento State College. Ten whole mounts were made and stained with aceto-carmine and counter-stained with fast green. Serial sections were cut in paraffin at 7 and 10 microns. A number of sets of serial sections were stained in alum-hematoxylin and counter-stained in eosin. Ten sets of serial sections were stained by the periodic acid-Schiff technique.

Systematics

NEXILIDAE, new family

Maricolous triclad turbellarians with oovitelline ducts entering the penis bulb.

Nexilis HOLLEMAN & HAND, gen. nov.

With the characters of the family. Type: *Nexilis epichitonius*, spec. nov.

Nexilis epichitonius HOLLEMAN & HAND, spec. nov.

The mature living specimens are 3 mm. long and 1.5-2.0 mm. wide. Flattening during fixation may distort the shape so that the specimens may be slightly longer (4 mm.) and wider (3 mm.). The living specimens are white except for the black eyes and the gut which is dark blackish-brown in color. Auricles are absent. Two eyes are located a short distance from the anterior margin, directly in front of the brain. Sections through the eyes show that they are pigmented ocellar cups without lenses. The epidermis is ciliated dorsally and ventrally.

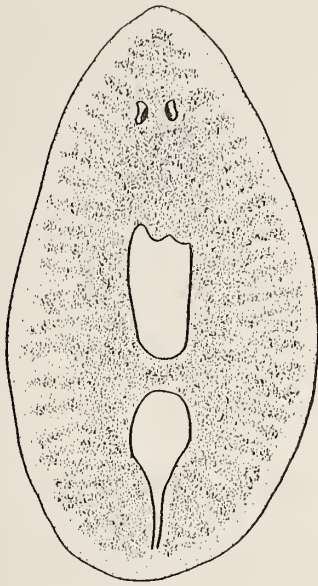


Figure 1: *Nexilis epichitonius* HOLLEMAN & HAND, gen. et spec. nov.; drawn from a living specimen (specimen 2.5 mm. long)

The male part of the reproductive system consists of four pairs of ventral testes segmentally arranged in a bilateral distribution. The members of the pairs are separated from one another by the anterior branch of the gut. The testes are located directly behind the ovaries. The sperm ducts run ventrally from the testes and posteriorly, parallel and medial to the ventral nerves, past the pharyngeal cavity, then upward in an S-shaped curve to enter separately into the seminal vesicle. The seminal vesicle connects with the large cavity, the bulbar lumen, within the base of the penis by means of a minute canal within a papilla which protrudes posteriorly from the posterior wall of the seminal vesicle. The papilla has a muscular appearance.

The female part of the reproductive system consists of a pair of ovaries located directly behind the brain and anterior to the testes. The ovovitelline ducts run posteriorly along the course of and lateral to the ventral nerves. Along the length of the ducts vitellaria can be observed. At the posterior end of the pharyngeal cavity, the ovovitelline ducts converge dorsally to a point directly above the enlarged proximal maximal area of the bulbar lumen. At this point the ovovitelline ducts unite to form a common ovovitelline duct. The common ovovitelline duct enters the roof of the bulbar lumen. Located around the common ovovitelline duct are glandular structures which are interpreted as cement glands. Egg capsules have been ob-

served in living and preserved specimens and in sectioned material. The egg capsule occupies the enlarged proximal maximal area of the bulbar lumen. When the egg capsule is present, the seminal vesicle is compressed anteriorly and the penis bulb and penis papilla are distended posteriorly. Discharge of the egg capsule has not been directly observed, but living specimens have been observed a short while after discharge of the egg capsule. Evidence of rupturing of the body wall for the discharge of the egg capsule has not been found, but observations suggest that the egg capsule is passed down the ejaculatory duct and discharged through the common gonopore. This passage of the egg capsule is probably aided by the extensive musculature of the penis bulb and penis papilla.

Within the ovaries are developing oocytes and eggs. Sperm have been observed at the exit of the ovovitelline duct from the ovary, and in some specimens sperm have been observed in the ovary proper.

An occasional variation in the arrangement of the testes has been observed. The variation consists of: first, three pairs of testes segmentally arranged in a bilateral distribution; second, three testes located on one side of the gut and four on the opposite side; the remaining variations were three and five, three and six, and finally four and five testes on opposite sides of the body.

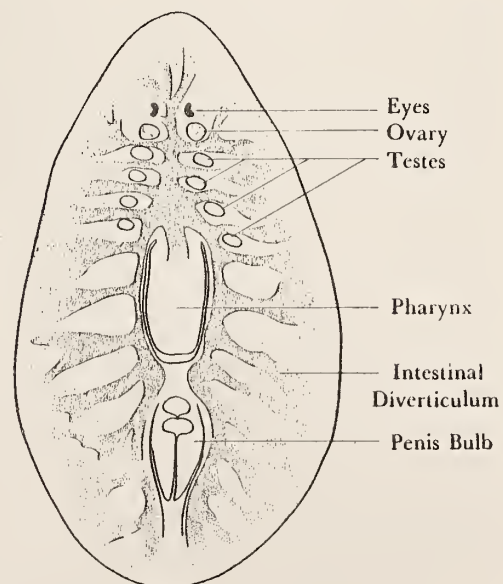


Figure 2: *Nexilis epichitonius* HOLLEMAN & HAND, gen. et spec. nov.; drawing from a cleared whole-mount to show the distribution of the gonads.

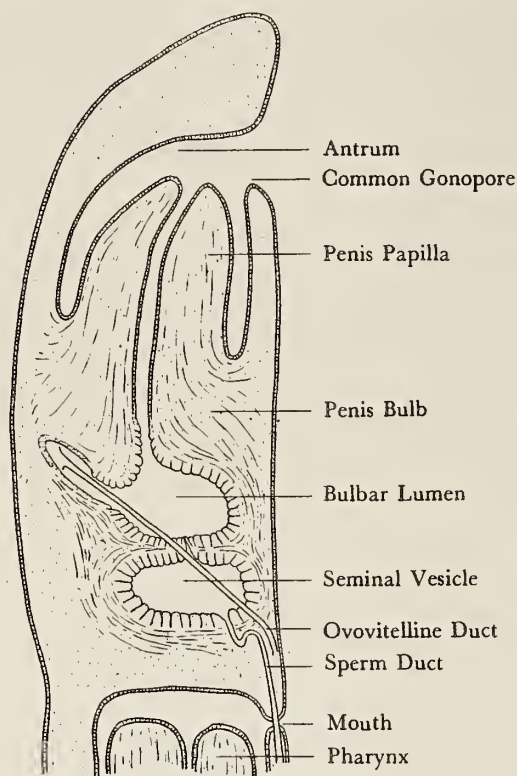


Figure 3: Semidiagrammatic median sagittal section of *Nexilis epichitonius* HOLLEMAN & HAND, gen. et spec. nov. showing the copulatory apparatus.

The triclad was found in association with *Mopalia hindsii* (Reeve, 1847) and was first observed in the mantle cavity of this chiton. Upon further investigation of the only other chiton in the vicinity, *M. muscosa* (Gould, 1846), the flatworm was observed to associate only with *M. hindsii*. At times the flatworm was observed on the dorsal side of the mantle and under the edges of the plates. The worm does not seem to be parasitic on the chiton, but rather exists as a commensal.

The specimens received from Mr. Westervelt were found in a marine aquarium. The material in the aquarium had been collected from the north shore of Smuggler Cove near Short Sand Beach State Park in Tillamook County, Oregon, and no chitons were included. Dr. Eugene Kozloff, Lewis and Clark College, reports the worm to be in association with *Mopalia hindsii* at Smuggler Cove.

The specimens from Mr. Wright were collected on a dead *Cancer productus* Randall, 1839, at Sausalito, Marin County, California.

The specimens were returned to the laboratory and fixed in Bouin's fixative.

Specimens which were received from Dr. D. Abell were collected from the South Jetty, Coos Bay, Coos County, Oregon, on *Thais emarginata* (Deshayes, 1839).

The type locality is designated as Stinson Beach, California (122° 37' W.; 37° 53' N.). The holotype (A. M. N. H. No. 503), as a set of sagittal sections, as well as 10 preserved paratype specimens (A. M. N. H. No. 504) have been deposited in the invertebrate section of the American Museum of Natural History.

Acknowledgment

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